

# Solar Water Heaters for Swimming Pools



**RENEWABLE ENERGY**  
THE INFINITE POWER  
OF TEXAS

## HIGHLIGHTS

- Solar heaters for swimming pools are cost-effective
- Installation is straight-forward
- Pool covers dramatically increase efficiency

## SUMMARY

In some parts of Texas, using the sun to heat a swimming pool is an effective way to use solar energy. Solar pool heaters can be connected to the pool's existing water circulation system. They can cost anywhere from \$2,000 to \$5,000, need very little maintenance and can sometimes allow people to swim during months that are usually too cold to swim.

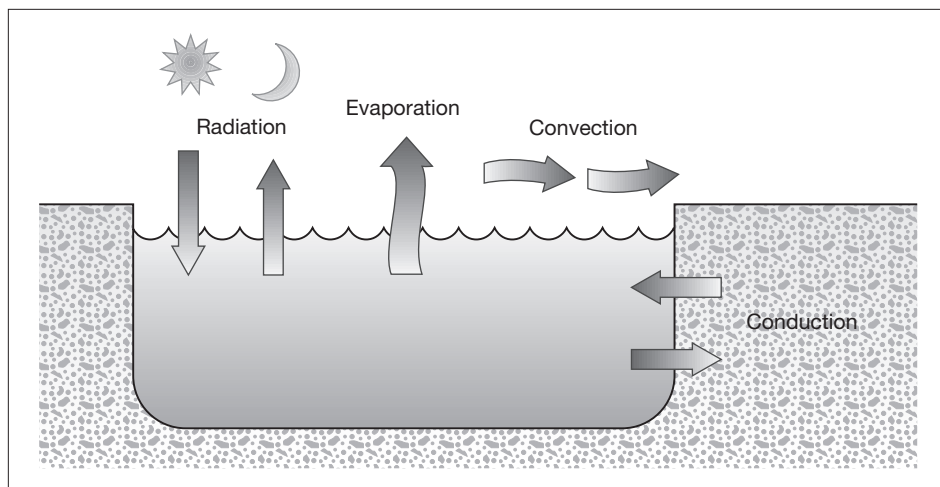
## COLLECTORS: SIZING AND ORIENTATION



SOURCE: SUN TRAPPER SOLAR SYSTEMS

**SOLAR PANELS** The solar panels are on the upper left section of the roof.

A typical solar pool heater consists of a collector that is made of plastic panels. The panels have tubes (called headers) on the top and bottom of the panel that allow water to flow into and out of the plastic panel. The headers are connected by many small tubes through which water flows and gets heated by the sun. The size of a collector needed for a swimming pool depends on several factors including the size of the pool, climate, desired water temperature,



**HEAT LOSS** *Swimming pools can lose heat rapidly.*

wind conditions, how shaded the pool is and how often the pool will be used. Normally, the total area (square footage) of the solar collector will be at least half of the pool surface area. For example, if the pool covers 500 square feet, the collectors should be at least 250 square feet.

Collectors should face south and be tilted at an angle equal to the latitude of the pool's location minus 10 to 15 degrees. If this is not possible and the collectors must be laid flat or must face west, the collector will not get as much sunlight. In this case, a larger collector area will be needed to make up for the decrease in collector efficiency resulting from less sunlight. Pool collectors can either be mounted on the roof of a building or mounted on a frame on the ground near the pool. Where the collectors get placed depends on how much space is available and how much sunlight shines on the space.

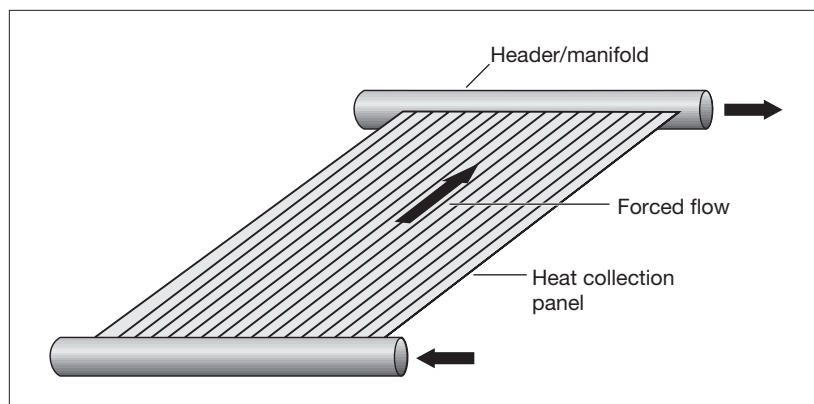
## COVER UP

Pools lose heat through convection, evaporation and radiation from the pool surface, and by conduction

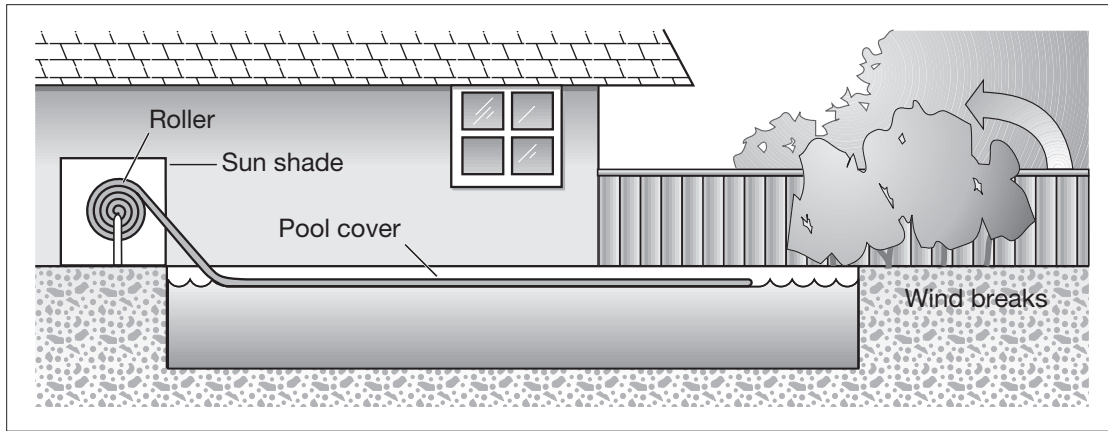
from the sides or walls of the pool. The amount of heat that is lost depends on many factors, such as the water temperature, air temperature, humidity, pressure, and wind across the pool surface. On average, outdoor pools lose almost 90% of their heat from the water surface: 70% by convection and evaporation, which are related, and 20% by

radiation to the sky. About 10% is lost by conduction from the sides and bottom.

The best way to prevent the heat loss from evaporation is with a plastic pool cover. A pool cover costs about 50 cents per square foot and can last up to five years. A clear or translucent cover works better than a dark or opaque cover because it allows sunshine to warm the pool through the day. Placing a cover over the pool can raise water temperatures between 5°F and 10°F. The actual amount depends on the type of cover, when and how long it is used during the day, and how much sunlight the pool gets.



**TYPICAL POOL COLLECTOR** *Square footage depends on several factors, such as the size of the pool and the desired water temperature.*



**POOL COVERS** *Placing a cover over the pool is the simplest way to prevent heat loss.*

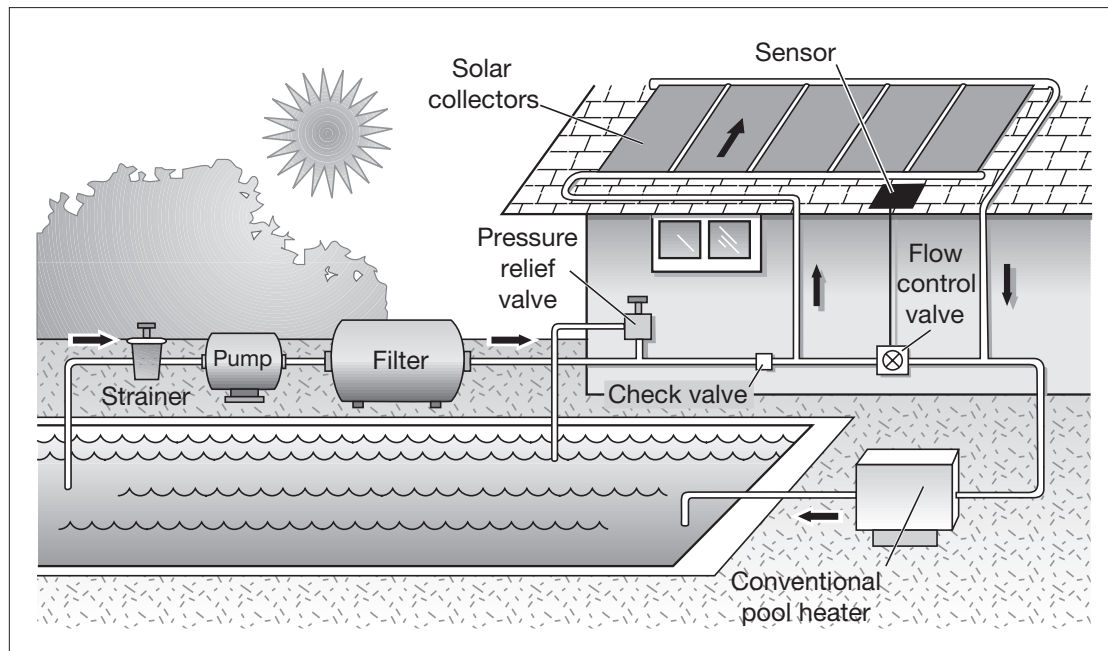
Although covering and uncovering the pool requires more work, covers are an inexpensive way to keep the pool water warm and reduce the amount of water lost to evaporation.

## CARE OF THE POOL HEATER

Most swimming pools have filtering systems to maintain good water quality in the pool. The plumbing of a solar pool heating system is connected to the pool's existing filter system. Special equipment controls the water

flow between the pump, the filter, the solar collector and the pool.

If solar collectors are being added to an existing pool, a new circulation pump may need to be added because the existing pump may be too small to move the water through the collectors. In parts of Texas where freezing temperatures are common, special equipment should be installed to allow all water to drain when the system is turned off so the pipes will not freeze and become damaged.



**SOLAR WATER HEATER SYSTEM** *Solar collectors become part of the existing system.*

## ORGANIZATIONS

### American Solar Energy Society

2400 Central Ave., G-1  
Boulder, CO 80301  
(303) 443-3130  
[www.ases.org](http://www.ases.org)

### Florida Solar Energy Center

1679 Clearlake Road  
Cocoa, FL 32922  
(407) 638-7400  
[www.fsec.ucf.edu](http://www.fsec.ucf.edu)

### Texas Solar Energy Society

P.O. Box 1447  
Austin, TX 78767-1447  
(800) 465-5049  
e-mail: [info@txses.org](mailto:info@txses.org)  
[www.txses.org](http://www.txses.org)

### Texas Renewable Energy Industries Association

P.O. Box 16469  
Austin, TX 78761  
(512) 345-5446  
[www.treia.org](http://www.treia.org)

## RESOURCES

### FREE TEXAS RENEWABLE ENERGY INFORMATION

For more information on how you can put Texas' abundant renewable energy resources to Use in your home or business, visit our website at [www.InfinitePower.org](http://www.InfinitePower.org) or call us at 1-800-531-5441 ext 31796. Ask about our free Teacher Resource Guides and CD available to teachers and home schoolers.

### ON THE WORLD WIDE WEB:

The U.S. Department of Energy website offers free software that can be used to analyze current energy consumption in your pool. It will also help project savings from a variety of energy management systems from pool covers to solar heating systems.

Go to -

[www1.eere.energy.gov/solar/sh\\_basics\\_pool.html](http://www1.eere.energy.gov/solar/sh_basics_pool.html)

Reduce Swimming Pool Energy Cost

[www.rlmartin.com/rspec/software.htm](http://www.rlmartin.com/rspec/software.htm)

**El Paso Solar Energy Association.** Lots of good information.

[www.epsea.org](http://www.epsea.org)

**Florida Solar Energy Center**

[www.fsec.ucf.edu/solar/install/solarmanual.htm](http://www.fsec.ucf.edu/solar/install/solarmanual.htm)

Solar heating systems and green building products.

[www.oikos.com](http://www.oikos.com) or [www.energy.sourceguides.com/index.shtml](http://www.energy.sourceguides.com/index.shtml)

**A Source for Green and Sustainable Building** covering energy, water, building materials, solid waste and other topics.

[www.greenbuilder.com/sourcebook](http://www.greenbuilder.com/sourcebook)

### Books:

#### *Passive Solar Energy Book*

Edward Mazria, Rodale Press, 1979

(Often available in libraries)



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# InfinitePower.org

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